Brown Marmorated Stink Bug
(*Halyomorpha halys*)

Stink Bug Management Workshop
Nov. 21, 2014

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UC Cooperative Extension, Sacramento County

http://cesacramento.ucanr.edu
Brown Marmorated Stink Bug
(*Halyomorpha halys*)

Photos: Baldo Villegas
Brown Marmorated Stink Bug
*(Halyomorpha halys)*

- Native to East Asia (China, Japan, Korea, Taiwan)
- A crop pest in its native range and here
- ID’d in Allentown, PA 2001
- Household nuisance pest in fall, winter
- Host list currently 170 spp., likely to rise
Established populations in:
Butte
Los Angeles
Sacramento
San Joaquin
Santa Clara
Sutter
Sutter
Yolo (new)
Actual adult size 5/8 inch

Two white bands on antennae

Banded legs

Rust color with broad brown markings

Smooth “shoulder” edges

Banded abdominal edge extending beyond wings

Mature nymph (5th instar)

Photo: UC IPM
Eggs (20-30) & nymphs

Nymph (3rd of 5)

Adult
Rough Stink Bug vs. BMSB

Rough stink bug

BMSB
Rough Stink Bug vs. BMSB

Rough stink bug
- Pointed
- Rough
- Narrower angle

BMSB
- Blunt
- Smooth
- Wider angle
Conspersse Stink Bug vs. BMSB

Conspersse stink bug

- Solid brown
- 1/2 inch

BMSB

- Marble color
- 5/8 inch
Female Male 5 Nymphal Instars

- Overwinters as adult in sheltered areas
  - Tree crevices and homes, barns, other structures
- Each adult lives 6-8 months
- Female lays about 250 eggs, mates multiple times
  - Each female can lay up to 9 egg clusters
- 1-2 generations in Mid-Atlantic states
Aggregation Season (late summer), Pennsylvania

Photos: Tracy Leskey
Aggregation Behavior

Photos: Tracy Leskey
BMSB
An Arboreal Species
Sacramento
March 2014

Downspout

Under bark
Host Plants
Crops

- Stone fruits (esp. peach), pome fruits
- Berries
- Grapes (not a major host)
- Eggplant, tomato, okra, pepper, corn, beans, sunflower
Host Plants
Selected Ornamentals

- Catalpa
- Chinese pistache
- Elm
- Maple
- Holly
- Princess tree *(Paulownia)*
- Pyracantha
- Redbud
- Rose
- Tree of heaven
- Waxleaf privet
BMSB Damage

Sacramento 5/22/2014
BMSB Damage
Sweet Corn a High-Preference Crop

Up to 100% of ears with injury, Beltsville MA 2011
BMSB Traps
Dead-Inn Traps (AgBio, Inc.)

Grower
48” tall, $30

Professional
24” tall, $20

Homeowner
16” tall, $17
Phermone Traps
Rocket Trap (Rescue)

$17
Phermone Traps & Lures

AgBio, Inc.: $4.25
Rescue: $6 (4 wks.), $10 (9 wks.)
Alpha Scents $4.40 (4 wks.)
Trece – Coming soon

Vaportape (kill bugs in trap)
Understanding BMSB Pheromones
Two Main Lure Types

1. Pheromone lures (USDA #10 and #20)
   » Harlequin bug pheromone – nearly identical

2. “Synergist” = methyl decatrienoate (MDT)

Best used in combination
2014 Trap Locations & Counts
Midtown Sacramento

Adults/Nymphs

- 64/532
- 90/691
- 11/9
- 219/155
- 22/98
- 3/4
- 7/7
- 0

Locations:
- 10th St.
- 16th St.
- Q St.
- T St.
Adults Trapped
Sacramento, 2014

Adult BMSB/day/trap
Avg. of 4 traps, 2014

No. of Adults/trap/day


First eggs
Predicted 2nd gen. eggs
Nymphs Trapped
Sacramento, 2014

BMSB Nymph Trap Catches
Avg. of 4 traps, 2014

No. of Nymphs/trap/day


First eggs

Predicted 2nd gen. eggs
BMSB “lethality index” (immediate mortality with little or no recovery)

- 4.5 hrs. exposure to dry residue, glass containers
- Field efficacy may differ
<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Lethality Index</th>
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</thead>
<tbody>
<tr>
<td>Dimethoate</td>
<td>93.3</td>
<td>Cyfluthrin</td>
<td>49.0</td>
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<tr>
<td>Malathion</td>
<td>92.5</td>
<td>Oxamyl</td>
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<td>Bifenthrin</td>
<td>91.5</td>
<td>Esfenvalerate</td>
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<td>Methidathion</td>
<td>90.4</td>
<td>Imidacloprid</td>
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<tr>
<td>Endosulfan</td>
<td>90.4</td>
<td>Tolfenpyrad (SC)</td>
<td>36.5</td>
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<td>Methomyl</td>
<td>90.1</td>
<td>Tolfenpyrad (EC)</td>
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<tr>
<td>Chlorpyrifos</td>
<td>89.0</td>
<td>Pyrifluquinazon</td>
<td>28.3</td>
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<tr>
<td>Acephate</td>
<td>87.5</td>
<td>Kaolin Clay</td>
<td>23.1</td>
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<tr>
<td>Fenpropathrin</td>
<td>78.3</td>
<td>Diazinon</td>
<td>20.4</td>
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<tr>
<td>Permethrin</td>
<td>77.1</td>
<td>Phosmet</td>
<td>20.0</td>
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<tr>
<td>Azinphosmethyl</td>
<td>71.3</td>
<td>Acetamiprid</td>
<td>18.8</td>
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<tr>
<td>Dinotefuran</td>
<td>67.3</td>
<td>Thiacloprid</td>
<td>18.3</td>
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<tr>
<td>Kaolin Clay + Thiamethoxam</td>
<td>66.7</td>
<td>Abamectin</td>
<td>16.3</td>
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<td>Formetanate HCl</td>
<td>63.5</td>
<td>Indoxacarb</td>
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<tr>
<td>Gamma-cyhalothrin</td>
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<td>Spirotetramat</td>
<td>9.8</td>
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<tr>
<td>Thiamethoxam</td>
<td>56.3</td>
<td>Carbaryl</td>
<td>9.2</td>
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<tr>
<td>Clothianidin</td>
<td>55.6</td>
<td>Flonicamid</td>
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<tr>
<td>Beta-cyfluthrin</td>
<td>54.8</td>
<td>Water (Control)</td>
<td>5.8</td>
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<td>Lambda-cyhalothrin</td>
<td>52.9</td>
<td>Cyantraniliprole</td>
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<td>Zeta-cypermethrin</td>
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## Insecticide Bioassay Results – Top 10

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Trade Name (Example)</th>
<th>Insecticide Class</th>
<th>Lethality Index</th>
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<tbody>
<tr>
<td>Dimethoate</td>
<td>Dimethoate</td>
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<td>93.3</td>
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<td>Malathion</td>
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<td>OP</td>
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<td>Brigade</td>
<td>Pyrethroid</td>
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<td>Supracide</td>
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<td>Lannate</td>
<td>Carbamate</td>
<td>90.1</td>
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<tr>
<td>Chlorpyrifos</td>
<td>Lorsban</td>
<td>OP</td>
<td>89.0</td>
</tr>
<tr>
<td>Acephate</td>
<td>Orthene</td>
<td>OP</td>
<td>87.5</td>
</tr>
<tr>
<td>Fenpropathrin</td>
<td>Danitol</td>
<td>Pyrethroid</td>
<td>78.3</td>
</tr>
<tr>
<td>Permethrin</td>
<td>Pounce</td>
<td>Pyrethroid</td>
<td>77.1</td>
</tr>
</tbody>
</table>
Insecticide Efficacy Field Study (Leskey et al., 2013)

- High mortality on day of application: Endosulfan (e.g., Thiodan), methomyl (Lannate), thiamethoxam (Actara), and bifenthrin (e.g., Brigade)
- Fenpropathrin (Danitol) and dinetofuran (Venom, Scorpion): strong anti-feeding effect for 7+ days
- Peaches in Mid-Atlantic: 10-12 weekly applications, alternate-row, late May-harvest using pyrethroids and neonicotinoids
- Effective insecticides in lab: only 60% average mortality in the field when applied late early July, 40% in Aug., and 20% in September
Products that have shown good effectiveness against BMSB include:

» Pyrethroids: Baythroid XL (B-cyfluthrin), Danitol (fenpropathrin), Warrior II (Beta-cyfluthrin), products containing permethrin (e.g. Pounce)

» Neonicotinoid: Belay (clothianidin)

» Carbamate: Lannate (methomyl)

» Premixtures: Endigo ZC (Beta-cyfluthrin + thiamethoxam) and Leverage 360 (imidaclorpid + cyfluthrin)
Alternative BMSB Management
Penn. State Univ., Rutgers Univ.

- Border applications
  - Use strong residual products
- Treat surrounding vegetation, if feasible
- Alternative crop plantings
  - Possible trap crops (e.g., beans, Paulownia trees)
  - Spray trap crops
Organically Acceptable Insecticides

Partial to fairly good control of nymphs only:

- Pyrethrum
- Azadirachtin
- Spinosad
- Sabadilla
- Insecticidal soap
- Combinations
Biological Control?

- Foreign exploration done by USDA
- Egg parasitoids - *Trissolcus* spp.
- Possible release in Calif. in 2016
Assassin bug

Predators Seen in 2014

Praying mantis

Spiders
Questions?

Important Web Sites

StopBMSB.org
ucipm.ucdavis.edu
cesacramento.ucanr.edu